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Optimization of antioxidant extraction in hylocereus polyrhizus seed using response surface methodology

ABSTRACT

Seeds of red pitaya fruit (Hylocereus polyrhizus) are commonly left underutilized in the food industry. Thus, the objective of this present study was to optimize the extraction condition for the maximum DPPH radical scavenging activity of red pitaya fruit seed extract using response surface methodology (RSM). A Central Composite design was employed to determine the effects of the selected variables, comprising extraction time (30-90 min), extraction temperature (40-80 ℃) and ethanol concentration (60-80 %) on the DPPH scavenging activities. Data were analyzed by using Design Expert (version 10.0.1, Stat-Ease, Inc., Minneapolis, MN, USA) statistical analysis software. The optimal extraction conditions for the highest antioxidant capacity were derived at 45 mins of extraction time, 70℃ extraction temperature and 80 % ethanol concentration that resulted in 92.89 % of scavenging activity. The optimized model developed was verified by comparing the predicted and experimental value of response. The result of measured response agreed well with the predicted values, demonstrating that the model can be used for optimizing the conditions of RSP extract that ensure high recovery of DPPH radical scavenging activity.

Keyword: Red pitaya fruit seed; Extraction condition; Antioxidant; DPPH radical scavenging activity; Response surface methodology